PLANE SENSE

Your Link To Aviation Communications

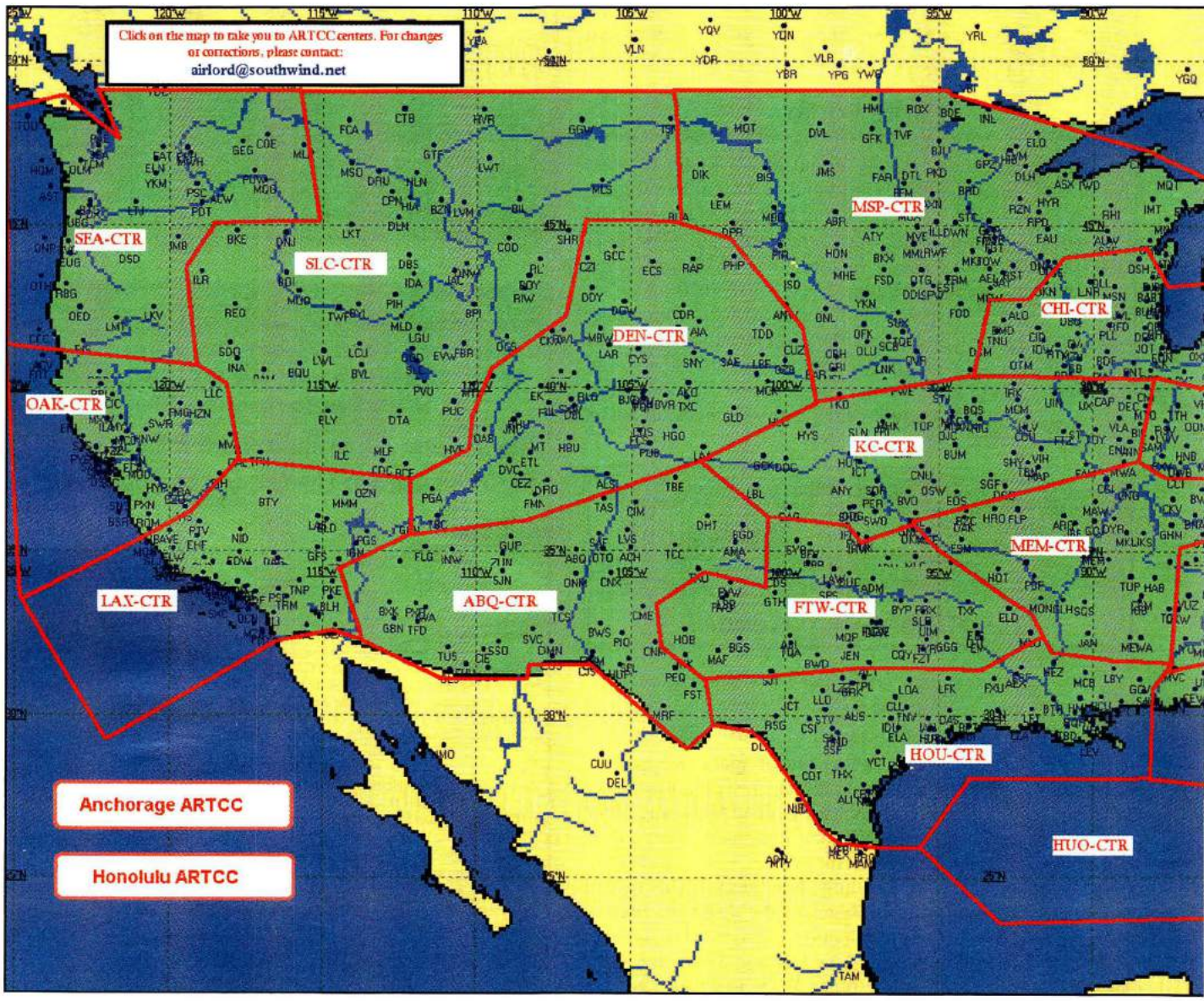
Air Route Traffic Control Centers

It's not going to be that cold this winter here in Florida. My wife Candy and I are discussing just how many cans of fake snow we're going to buy for this year's Christmas tree. To all of you, I wish happy holidays.

This is the fourth and final installment on the ATC system. In August, I showed you what is done at a Flight Service Station (FSS). In September, you saw how controllers at the Airport Traffic Control Towers (ATCT) operated. Last month, the column dealt with Approach Controls (TRACONs, RAPCONs, RATCFs, etc.). This month, I'll deal with the facilities with the most controllers and the fewest facilities, the Air Route Traffic Control Centers (ARTCC), or just Center.

There are 21 Centers and three CERAPs which are Centers with approach controls located in them. The three CERAPs are Agana, Guam; Honolulu, Hawaii; and San Juan, Puerto Rico. The Centers and CERAPs are (with their identifiers):

ZAB — ALBUQUERQUE, NM, ALBUQUERQUE ARTCC
ZAN — ANCHORAGE, AK, ANCHORAGE ARTCC
ZAU — CHICAGO, IL, CHICAGO ARTCC



The national airspace system.

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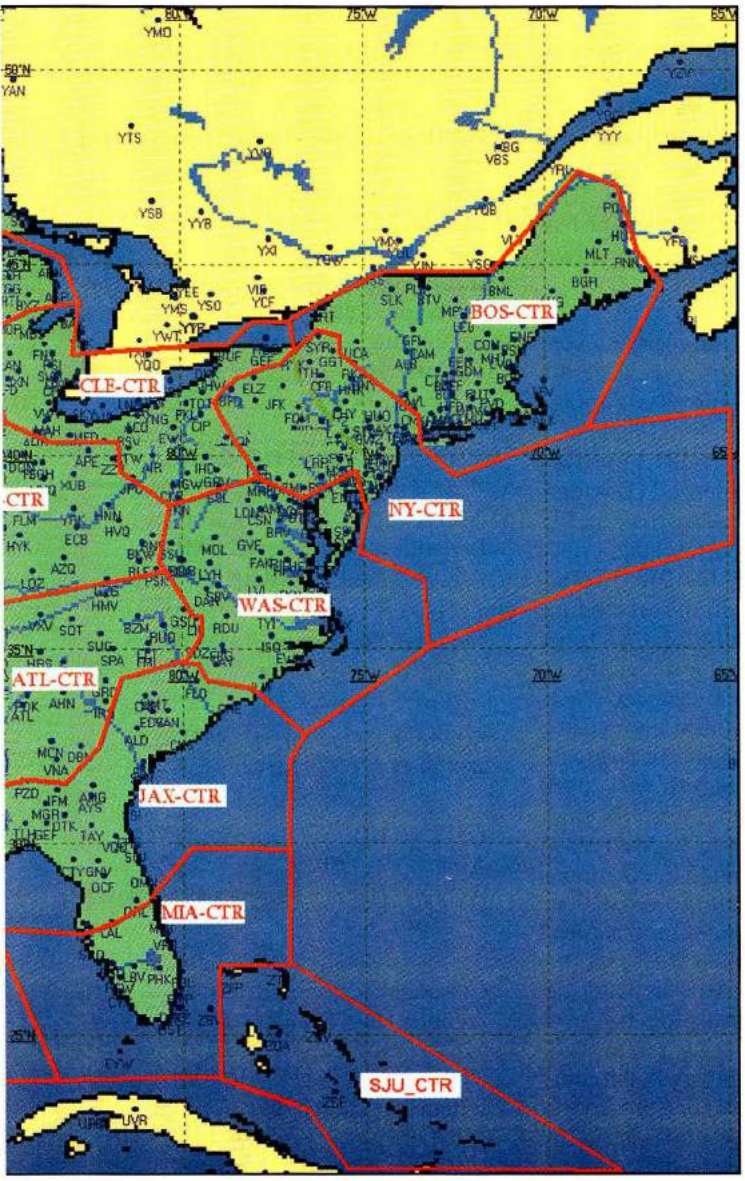
ZBW — NASHUA, NH, BOSTON ARTCC
ZDC — WASHINGTON, DC, WASHINGTON ARTCC
ZDV — DENVER, CO, DENVER ARTCC
ZFW — FORT WORTH, TX, FORT WORTH ARTCC
ZHN — HONOLULU, HI, HONOLULU CERAP
ZHU — HOUSTON, TX, HOUSTON ARTCC
ZID — INDIANAPOLIS, IN, INDIANAPOLIS ARTCC
ZJX — JACKSONVILLE, FL, JACKSONVILLE ARTCC
ZKC — OLATHE, KS, KANSAS CITY ARTCC
ZLA — LOS ANGELES, CA, LOS ANGELES ARTCC
ZLC — SALT LAKE, UT, SALT LAKE CITY ARTCC
ZMA — MIAMI, FL, MIAMI ARTCC
ZME — MEMPHIS, TN, MEMPHIS ARTCC
ZMP — MINNEAPOLIS, MN, MINNEAPOLIS ARTCC
ZNY — NEW YORK, NY, NEW YORK ARTCC
ZOA — OAKLAND, CA, OAKLAND ARTCC
ZOB — CLEVELAND, OH, CLEVELAND ARTCC
ZSE — SEATTLE, WA, SEATTLE ARTCC
ZSU — SAN JUAN, PR, SAN JUAN CERAP
ZTL — ATLANTA, GA, ATLANTA ARTCC
ZUA — AGANA, GU, GUAM CERAP



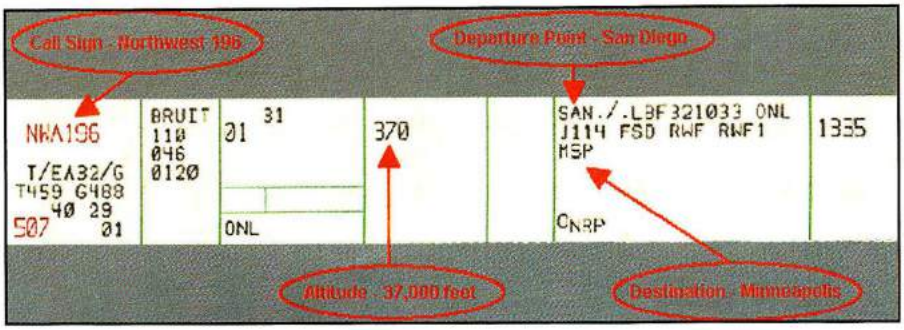
The Air Route Traffic Control Center is defined as "(a) facility established to provide air traffic control service to aircraft operating on IFR flight plans within controlled airspace and principally during the en-route phase of flight. When equipment capabilities and controller workload permit, certain advisory /assistance services may be provided to VFR aircraft." One of the best statements I've found about the center is found on the Denver ARTCC site at http://www.nw. faa.gov/ats/zdvartcc/: "The Federal Aviation Administration has made a long-term investment of your tax dollars by providing the finest air traffic control service in the world. The largest component of the national airspace system is the air route traffic control center. Covering 285,000 square miles of the Mountain West, the Denver Air Route Traffic Control Center is one of 20 such facilities in the United States that provides air traffic service to a multi-state area. This is your facility, built to ensure safe and expeditious air travel. Denver Center is open seven days a week, 24 hours a day and employs a combination of several hundred Air Traffic Control Specialists, Electronic Technicians, Computer System Specialists, Environmental Support Specialists, and administrative staff."

This map shows the boundaries of the ARTCC's in the 48 contiguous states.

Controllers at Centers provide separation for most areas that are not covered by towers and approach controls at low altitudes and also most of the upper level airspace, up to 60,000 feet and higher. (Few aircraft can fly above 60,000 feet, called flight level 600, mainly military jets). Because of the larger areas covered by radar and the altitude of the aircraft involved, separation standards have been increased to compensate. While in the lower airspace normal separation may be three to 10 miles lateral or longitudinal separation or 1,000 to 2,000 feet vertically, this increases to as much as 20 miles lateral/longitudinal with separation of up to 5,000 feet when above 60,000 feet. Like much the air traffic at lower altitudes, the aircraft working with the centers are normally flying under instrument flight rules (IFR) and are normally flying in the victor routes when below 18,000 feet and on jet routes at and above 18,000. (Remember the maps I told you about in July *Pop'Comm*?) Increasingly more aircraft flying at these altitudes utilize GPS and fly a more direct route, rarely having to use the "highways in the sky."

Flight Progress Strips

In addition to the radar used by the controllers there is still the old standby of paper and pencil. In the case of ATC, it is the Flight Progress Strip. These are automatically printed at various sites in all ATC facilities. The one pictured here shows an Airbus (T/EA32/G) with a call sign of Northwest 196 (NWA196) flying from San Diego, CA (SAN) to Minneapolis-St. Paul, MN (MSP) while flying 33 miles northwest of Scottsbluff, NE (LBF321033) among others and flying at flight level 370, or an altitude of 37,000 feet (370). (The flight progress strips at approach controls and towers are a slightly different format, especially for those controllers). With these strips a controller can see at a glance virtually everything he needs in order to keep pilots from occupying each other's space.



A typical flight progress strip.

A controller at approach controls and towers must be checked out at each position in order to be "certified" at the facility. Such is not the case at the centers. As you can see Denver Center alone occupies 285,000 square miles of airspace. Because of this the center's airspace is carved into sectors, both high and low and controllers are only required to be certified in just a few. It is not uncommon for an airline pilot at high altitude to talk to three or four sectors of each center as he flies cross-country.

As you look in the Airport Facility Directories (A/FD) we discussed in the May 2000 *Pop'Comm* and the instrument maps I recommended in the July 2000 *Pop'Comm,* you noticed the many VHF and UHF frequencies. You may notice that some of them are in regular type and others in bold. Bold normally signifies those operated in the high altitude sectors of the centers. Here you find the majority of airlines, biz-jets, and high performance military aircraft.

How It All Works Together

To give you an idea as to how the four parts of ATC work together, let me give you some examples.

Example 1 — A small, single-engine aircraft, perhaps a Cessna 172 flying between two airports, one with a control tower (Albany, Georgia {ABY}) and one without (Thomasville, Georgia {TVI}). He is flying under visual flight rules (VFR). He may contact the Flight Service Station, in this case the Macon FSS (MCN) on his radio or via telephone to get the current local and en-route weather. He then files a VFR flight plan. When he taxis out he uses the local Unicom frequency in order to warn other pilots he is departing. He will contact Macon FSS to activate or "open" his flight plan. He may at the same time give the FSS a pilot report (PIREP) of local or en-route weather conditions. Before he gets within five miles of the Albany airport, he contacts the Albany tower for permission to enter their airspace and land. After he lands his aircraft, he is instructed to contact the ground controller for his taxi instructions to parking. He will contact Macon FSS to "close" his flight plan. This must be done no later than 30 minutes after his estimated time of arrival or search and rescue procedures are implemented. The flight may only be 30 minutes and he has talked to at least three positions at two ATC facilities.

Example 2 — A slightly larger, twin-engine aircraft, perhaps a Beechcraft Baron-58 flying between two airports with towers (Melbourne, FL {MLB} and Orlando Executive, FL {ORL}) in two different approach controls (Daytona Beach, FL {DAB} and Orlando, FL {MCO}). After getting his weather briefing from St. Petersburg, FL (PIE) FSS he files a flight plan. He calls the Melbourne clearance delivery, calls for taxi from ground control and after receiving a release from Daytona Beach approach departs for Orlando. Almost immediately after taking off he changes frequencies to Daytona approach. Shortly he is over a "hand-off" point and control is then given to Orlando where he is given radar vectors away from Orlando International airport and towards Orlando Executive. Before he reaches five miles from his destination, he is given to the local controller at Orlando Executive. After he lands he contacts ground control for his taxi instructions to the parking ramp. This flight may also be 30 minutes, but in addition to the FSS he has talked to three positions at one tower, two positions at another and a minimum of one position at each approach control — at least eight different controllers.

Example 3 — A biz-jet, say a North American Sabreliner flying at 31,000 from Miami International, FL (MIA) to Grand Island, NE (GRI). After his briefing and flight plan filing with Miami FSS (MIA), he receives his en-route clearance, taxi clearance and take-off clearance from the controllers at Miami. After departure he initially talks to Miami approach until he climbs to a specific altitude where he must sent over to Miami Center. He is normally stair-stepped up to his final cruise altitude. This altitude may be changed due to traffic, weather, and/or turbulence. He will talk to Miami (ZMA), Jacksonville (ZJX), Atlanta (ZTL), Memphis (ZME), Kansas City (ZKC) and Minneapolis (ZMP) centers. There is no local approach control for Grand Island. It is operated by Minneapolis center. He will then be told to contact the Grand Island tower local controller and eventually the ground controller for taxi to the ramp. In this case he has talked to one FSS controller, five tower controllers, and at least two or three controllers in each center, for a minimum of 17 controllers from start to finish.

This overview has not been as in-depth as it could be, but I didn't want to confuse or bore you. I enjoy your E-mails. Keep them coming. Next month we'll cover Civil Air Patrol. ■

Frequencies

NEW

Imperial Municipal, NE (IML)
ASOS — 124.175 MHz

Mattoon/Charleston, IL (MTO)
ASOS — 109.4 MHz

Springfield Capital, IL (SPI)
ASOS — 127.65 MHz

CHANGED

Alpena, MI (APN)
Approach Control — was 118.5 MHz — now 128.425 MHz

Cleveland ARTCC (ZOB)
Altoona High Sector — was 119.925 MHz — now 132.125 MHz

Indianapolis ARTCC (ZID)
Bluefield Low Sector — was 128.4 MHz — now 126.575 MHz
Lynch Low Sector — was 253.5 MHz — now 257.85 MHz